FACT SHEET

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

APPLICANT:	Port of Olympia
FACILITY ADDRESS:	1412 N. Washington Street Port of Olympia Olympia, WA 98504
PERMIT NUMBER:	WA0040533
ACTIVITY:	Remediation of Contaminated Groundwater
LOCATION:	47° 3' 30" N; 122° 54' 9"
RECEIVING WATER:	Inner Budd Inlet Via LOTT Outfall/Diffuser

PUBLIC COMMENT AND INFORMATION:

The Port of Olympia (Port) has applied for a National Pollutant Discharge Elimination System (NPDES) Permit in accordance with provisions of Chapter 90.48 RCW, as amended, and the Federal Water Pollution Control Act (Clean Water Act), Title 33 United States Code, Section 1241 et. seq.

The permit authorizes the discharge of treated groundwater to Budd Inlet, subject to effluent limitations and other conditions necessary to carry out provisions of state and federal law.

Summary

A new permit is proposed to be issued with reductions in permit limits for some parameters. The reduction are made based on approximately eight years of operating data. Monitoring requirements were reduced from weekly to bi-weekly and monitoring of a few parameters were removed from the permit. As effluent results indicate in Appendix A, the groundwater treatment system has been operating with optimal pollutant removal efficiency the last five years. Most effluent results have been non-detect during the last five years.

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Appendix A

1. Receiving Water

The receiving water is Budd Inlet via the Lacey, Olympia, Tumwater and Thurston County (LOTT) outfall/diffuser. Budd Inlet is designated as a Class B marine surface water in the vicinity of Cascade Pole site (CPC). The applicable receiving water quality standards are those adopted by the Department of Ecology (Ecology) and approved by the Environmental Protection Agency (EPA) Regional Administrator pursuant to Section 303 of the Clean Water Act. Applicable standards are contained in Chapter 173-201 WAC.

2. Facility Background and Description of Discharge

The site (Figure 1, Appendix A) is located on a 10-acre parcel owned by the Port. The site was used for wood treating operations from about 1939 through 1986 by various plant owners/operators. Prior to the 1960s, creosote was the primary wood preservative used at the treatment facility. Creosote is composed of polynuclear aromatic hydrocarbons (PAHs). Beginning in 1967, pentachlorophenol (PCP) dissolved in a carrier oil was also used to treat poles. Copper may have been used as a wood preservative in the 1940s. CPC owned and operated the facility from 1967 until operations were permanently terminated in October 1986. Structures and equipment were removed in September 1990.

Under the Model Toxics Control Act (MTCA), Chapter 70.105D RCW, the CPC, Port, and Ecology negotiated two consent decrees and an agreed order to further investigate and remediate soil, sediment, and groundwater contaminated by wood treating chemicals from the former CPC facility at the Port.

In 1993, a 350 foot. sheet pile wall was installed along the shoreline to prevent release of wood treating product from the site into Budd Inlet from the site. In 1997, an underground slurry wall 3528-ft. (0.670 miles) long, enclosing 18 acres, was constructed surrounding the site. The slurry wall is basically an underground wall with an average depth of 23 ft. The slurry wall and the sheet pile wall are tied together to eliminate the subsurface migration of contamination.

Also in 2001-2002, approximately 42,000 cubic yards of contaminated sediment was removed from Budd Inlet and stored in the sediment containment cell on the upland part of the site.

One of the requirements of the consent decree is the design and implementation of a groundwater extraction and treatment system to provide hydraulic gradient control, recovery of light nonaqueous phase liquids (LNAPL), and extraction and treatment of aqueous phase contamination. Another requirement of the consent decree is the removal of dense nonaqueous phase liquids (DNAPL), which are also present in the shallow aquifer beneath the site.

The groundwater extraction system will consist of up to 14 extraction wells. The total extraction flow rate will be about 20 gallons/minute (gpm). The groundwater extraction rate will be controlled to ensure a hydraulic gradient is maintained inward toward the containment area. Pumps to remove separate phase NAPL will be installed in a groundwater extraction well if groundwater monitoring identifies a consistent presence of NAPL in the well.

The groundwater treatment system consists of phase separation, biological treatment, clarification and filtration, and granular activated carbon (GAC) polish. Extracted nonaqueous phase liquids (NAPL) will be pumped into a phase separation tank where NAPL and aqueous phase will be separated. Both LNAPL and DNAPL will be removed and disposed. Aqueous phase from the NAPL separation process, and contaminated groundwater extracted by the aqueous phase pumps located in each well will be pumped into an equalization tank. The equalized aqueous phase flow will then enter a fixed film biological system where bacteria and various microbes degrade organic contaminants. The biological system consists of two submerged fixed film bioreactors in parallel. Solids in the effluent from the bioreactors will be removed by a parallel plate clarifier followed by four particulate filters in parallel. Finally, the effluent will be filtered with GAC before discharge. The GAC system consists of two GAC canisters in series. Sludge from the bioreactor and filter elements are disposed of off-site.

Since 1993, approximately 70 million gallons of contaminated groundwater has been processed. The flow diagram of the treatment system is in Figure 2 of Appendix A.

Effluent Discharge Via LOTT's Outfall

The effluent from this site is mixed with the LOTT's outfall before discharge into the Budd Inlet. The effluent is approximately 0.288 percent of the LOTT's effluent. This was calculated based on 10 million gallons per day of LOTT's effluent and 0.0288 million gallons per day of effluent from the Port's remediation site. With an efficient removal of the pollutants by the groundwater treatment system from the Port's effluent as indicated in Figures 3 -15, Appendix A, and high dilution, this effluent from the Port's site does not have any impact on the water quality in Budd Inlet.

3. Compliance History with the Existing Permit, the Proposed Permit Limits and Monitoring Requirements

The original permit was issued in 1993 and expired in January 1998. The Port applied to obtain a new permit in 1998. The Department of Ecology (Ecology) has reviewed the permit application and informed the Port they should continue to operate under the existing permit until Ecology issues a new permit.

The compliance history and proposed permit limits for each permit parameter are summarized below:

A. Polynuclear Aromatic Hydrocarbons (PAH)

The review of discharge monitoring reports (DMRs) since 1993 showed complete compliance with permit limits. The DMRs data and their comparison with permit limits are shown in Figures 3 and 4 of Appendix A. The permit limits in the previous permit were 150 µg/l for the monthly average and 300 µg/l for the daily maximum.

Since the permittee has met the PAH permit limits during the last eight years, the new proposed permit limits will be reduced to 48 µg/l for the monthly average and daily maximum. This is a 68 percent reduction for the monthly average permit limit and an 84 percent reduction for the daily maximum permit limit in comparison with the previous permit limits. The effluent monitoring will be reduced from weekly to bi-weekly. Table A shows the group of compounds which form PAHs.

Table A: PAH Consists of 16 Compounds	
Naphthalene	Acenaphthylene
Acenaphthene	Fluorene
Phenanthrene	Anthracene
Fluoranthene	Pyrene
Benzo(a)anthracene*	Chrysene*
Benzo(b)fluoranthene*	Benzo(k)fluoranthene*
Benzo(a)pyrene*	Dibenzo(a,h)anthracene*
Benzo(ghi)perylene	Indeno(1,2,3-cd)pyrene*
*Carcinogenic PAHs	

The effluent is mixed with the discharge from LOTT effluent before being released into the Budd Inlet via outfall diffuser. The effluent from the site is 0.216 percent of LOTT's discharge. Therefore, the effluent from the site is diluted approximately 460 times with the LOTT's effluent being discharged. Based on the efficient groundwater treatment system and high dilution, the effluent from this site does not have any impact on water quality criteria for carcinogenic PAH.

Seven of the PAH listed in Table A are carcinogens as indicated. The human health criterion via fish and shellfish consumption for each carcinogenic PAH compound is 0.031 µg/l. There are no effluent data available in low concentration ranges for carcinogenic PAH that can be compared with the human health criteria of 0.031 µg/l. The new permit would require the permittee to test the effluent for PAH using low detection limit of 1.6 µg/l, i.e., 0.100 µg/l for each compound. Data in the low detection range would provide information comparable to human health criteria for carcinogenic PAHs.

B. Pentachlorophenol (PCP)

The previous permit limit for PCP was 6.5 µg/l for the monthly average and 13 µg/l for the daily maximum. The DMRs data from 1993 to 2001, showed compliance with the permit limit except for three violations in 1994 and 1996. DMRs data are shown in Figures 5 and 6 of Appendix A.

During the time period 1996-2001, the Port has complied with the permit limits. The new proposed permit limit for PCP will be 6.5 µg/l monthly average and reduced by 40 percent from 13 µg/l to 8.2 µg/l for daily maximum. The proposed permit limits were developed based on performance of the groundwater treatment system during the last five years. Since 1996, 31 data points out of 65 were reported to be non-detect. The detection limit was 0.10 µg/l. During 1996-2001, the average value of PCP in effluent was 0.560 µg/l.

The proposed permit limits were compared to acute, and chronic marine water quality criteria. In all cases the permit limits are lower than these values. The monthly average permit limit of 8.2 µg/l is equivalent to human health organism-based criterion for PCP.

Since there are eight years of treatment plant operating data and the permittee has shown consistent compliance with the permit limits, the monitoring requirements for the effluent will be reduced from four times a month to two times a month.

The previous permit had a PCP removal efficiency condition of 99.5 percent. This condition was necessary to ensure that the treatment system was operating in an optimized manner and to provide the operator with a process control tool in operating the treatment system. The data indicated during the past five years, the treatment system has been operating with greater efficiency than 99.5 percent.

C. Tetrachlorophenol (TCP)

A review of DMRs for the last eight years indicated the discharge was in complete compliance with an effluent limit of 219 µg/l for the monthly average and 440 µg/l for the daily maximum. The marine chronic water quality criterion is 440 µg/l; the maximum reported value in discharge monitoring was 25 µg/l. Since the highest measured value of TCP in the effluent is 94 percent less than the chronic water quality criteria for TCP, the permit limit for TCP will be removed from this permit. Figures 7 and 8 show the DMRs results and their comparison with the permit limit

D. Copper and Total Suspended Solids (TSS)

96 data points were analyzed for the copper. 70 percent of the data points were below acute water quality criterion of 3.1 µg/l. The copper data ranged from 1-21 µg/l with a mean of 3 µg/l and a median of 1 µg/l.

The effluent from the Cascade Pole site is mixed with the discharge from LOTT before being released into Budd Inlet via outfall diffuser. The discharge from Cascade Pole is 0.288 percent of LOTT's discharge. Therefore, effluent from the Port's site is diluted approximately 350 times with the LOTT's effluent, before being discharged. The dilution calculations showed that due to efficient groundwater treatment, the discharge of effluent into out does not have any impact on LOTT's effluent and water quality for copper in the Budd Inlet.

The data has showed that there is a relationship between TSS and copper in the effluent. In order to provide an additional process control tool for the operator of the plant to monitor TSS, both TSS and copper will continue to be monitored on a biweekly basis. Total Recoverable copper data and TSS data are displayed in Figures 9 and 10.

Total Dissolved Solids (TDS), Dissolved Oxygen (DO), Temperature, pH and Flow

The data for TDS, DO, Temperature, pH and flow are displayed in Figures 11, 12, 13, 14 and 15 in Appendix A. Analysis of the data indicated that pH was in compliance with the permit limit. DO values were within the water quality criteria and TDS data provided data about impact of salt water on groundwater. Temperature provided additional information about the effluent. Approximately 70 millions gallons groundwater has been processed.

There are approximately eight years of data for these parameters. Therefore, TDS, DO, temperature monitoring will not be required in the proposed permit. However, pH will continue to be monitored.

Whole Effluent Toxicity Results

The previous permit required effluent characterization by acute and chronic whole effluent toxicity. The effluent was tested four times during the first year of operation, during 1993-1994. The results are in Table B.

A new effluent characterization for toxicity testing will be written into the proposed permit in order to generate representative test results on the current effluent. The new permit will require the permittee to test the effluent quarterly for one year for acute toxicity and two times a year for chronic toxicity.

Table B: Summary of Effluent Acute and Chronic Bio-monitoring Results

Date	Testing Type/Species Tested	Organism Survival in 100% Effluent	LC50, %	Acute NOEC, %	IC25, %	Chronic NOEC, %
April 1994	Acute/M. Bahia	0	64	50		
April 1994	Acute/M. Berylline	0	67	50		
April 1994	Chronic/M.Bahia	0			51	25
April 1994	Chronic/M. Berllina	0			63	12.5
December 1993	Acute/M. Bahia	100	.>100	100		
December 1993	Acute/M. Berylline	100	>100	50		
December 1993	Chronic/M.Bahia	100			91	50
December 1993	Chronic/M. Berllina	100			60	100
October 1993	Acute/M. Bahia	100	>100	100		
October 1993	Acute/M. Berylline	40	71.5	50		
October 1993	Chronic/M.Bahia	100			>100	100
October 1993	Chronic/M. Berllina	40			>100	100
July 1993	Acute/M. Bahia	100	13.39	5		
July 1993	Acute/M. Berylline	100	8.60	<5		
July 1993	Chronic/M.Bahia	100			50	40
July 1993	Chronic/M. Berllina	100			49.95	20

LC50 **Concentration of Effluent Lethal to 50 of the Organism**

NOEC **No Observed Effect Concentration**

IC25 **Concentration Providing a 25 Inhibition of Growth or Reproduction in the Test Organisms**

M. Berllina = Menidia Berllina = Silverside Minnow

M. Babia = Mysidopsis Babia = East Coast Mysid

Table C: The proposed Permit Limits

Parameter	Monthly Average	Daily Maximum	Basis for the Permit Limits
Total PAHs[(1)]	48 µg/l	48 µg/l	Treatment System Performance Based
Pentachlorophenol (PCP)	6.5 µg/l	8.2 µg/1	Treatment System Performance Based/Human Health
pH	7.0-8.5 at all times	-	Water Quality Based
Treatment System Removal Efficiency for	99.5% at all times	-	Treatment System Performance Based

[(1)] Total polynuclear aromatic hydrocarbons are defined as the summation of the 16 following polynuclear hydrocarbons:

Naphthalene	Acenaphthylene
Acenaphthene	Fluorene
Phenanthrene	Anthracene
Fluoranthene	Pyrene
Benzo(a)anthracene*	Chrysene*
Benzo(b)fluoranthene*	Benzo(k)fluoranthene*
Benzo(a)pyrene *	Dibenzo(a,h)anthracene*
Benzo(ghi)perylene*	Indeno(1,2,3-cd)pyrene*
Carcinogenics PAHs*	

4. Monitoring and Reporting

Effluent samples will be collected from a sample port located in the groundwater treatment system's final effluent line prior to the tie-in to LOTT's discharge line (North Outfall). In addition, influent samples shall also be collected bi-weekly and analyzed for pentachlorophenol, so that removal efficiencies can be determined. Sampling and analysis of the effluent will be required according to the following schedule:

Table D: Monitoring Requirements

Parameter	Frequency	Sample Type
Discharge Flow	Continuous	Recording
PAHs	Bi-Weekly	24-hour composite
Pentachlorophenol	Bi-Weekly	24-hour composite
Copper	Bi-Weekly	24-hour composite
Total Suspended Solids (TSS)	Bi-Weekly	24-hour composite
Dioxins[1]	Semi-annual for one year	24-hour composite

[1] Testing for 2,3,7,8-tetra-CD-Dioxin and 2,3,7,8-tetra-CD-Furan. The Practical Quantitation Limits (PQL) are 10 PPQ.

5. Solid Waste/Residual Solids Disposal

This permit requires Port to handle and dispose of all solid waste in a manner which prevents its entry into ground or surface waters of the state. As part of groundwater treatment, sludge and spent carbon will be generated. The treatment system operations and maintenance plan is required to include a plan for the appropriate disposal of these materials.

6. Spill Plan

Nonaqueous phase liquids (NAPL) and aqueous phase contamination will be removed from the shallow aquifer beneath the site. The NAPL will be separated from the groundwater and transferred into storage tanks. Every few months, NAPL will be transported from the site to an active CPC facility, where the NAPL can be reused in the wood preserving process.

Preventative measures are necessary to avoid spills. Approved procedures for spill containment and control are required.

7. Treatment System Operation and Maintenance Plan

An approved treatment system operation and maintenance plan is required to ensure that the treatment system performs efficiently. The plan will provide technical guidance and regulatory requirements to the treatment system operator to optimize operation under both normal and emergency conditions.

All waste materials (e.g., spent carbon, biosolids, and maintenance-related materials) will be identified and properly disposed of. It will be determined if the Dangerous Waste Regulations (Chapter 173-303 WAC) apply to any wastes.

8. Bypass of Biological Treatment Component

Intentional bypass of the biological treatment component, due to bioreactor system failure, is allowed if the effluent limits can still be met with GAC treatment alone.

9. Permit Reopener

A permit reopener statement has been included in the permit. If the results of any of the studies discussed above indicate that further action (e.g., development of technology based limits, additional monitoring, or a toxicity reduction evaluation) is necessary, the permit reopener will allow Ecology to modify existing permit conditions and limitations or establish new conditions or limitations on the basis of monitoring results or other causes consistent with state and federal regulations.

10. Permit Fees

The discharge authorized by this permit is from a groundwater extraction and treatment system, which is a remedial action under the Model Toxics Control Act (MTCA) (Chapter 173-340 WAC). Ecology costs associated with this permit will be recovered as outlined in WAC 173-340-550, Payment of Remedial Action Costs. Therefore, permit fees established under Chapter 173-224 WAC are not applicable to this permit.

11. Permit Length

This permit is issued for a period of five years.

SUMMARY OF SCHEDULED ACTIVITIES AND REPORT SUBMITTALS

1. Submit a discharge monitoring report to Ecology	Monthly
2. Spill control plan	Update within six months of permit issuance, see S5 of the permit
3. Treatment system operation and maintenance plan	Update in case of a change 30-days after any change
4. Acute Toxicity	Quarterly for one year, 60 days after test
5. Chronic Toxicity	Semiannual for one year, 60 days after test

REFERENCES

1. Cascade Pole Corporation, NPDES Permit Application, June 3, 1998

2. U.S. EPA, 1991, Technical Support Document for Water Quality-based Toxics Control..

3. Washington Administrative Code, Chapter 173-201.

4. Washington Administrative Code, Chapter 173-220.

5. Washington Administrative Code, Chapter 173-240.

6. Washington State Department of Ecology, 2002, Permit-Writers Manual.

APPENDIX A

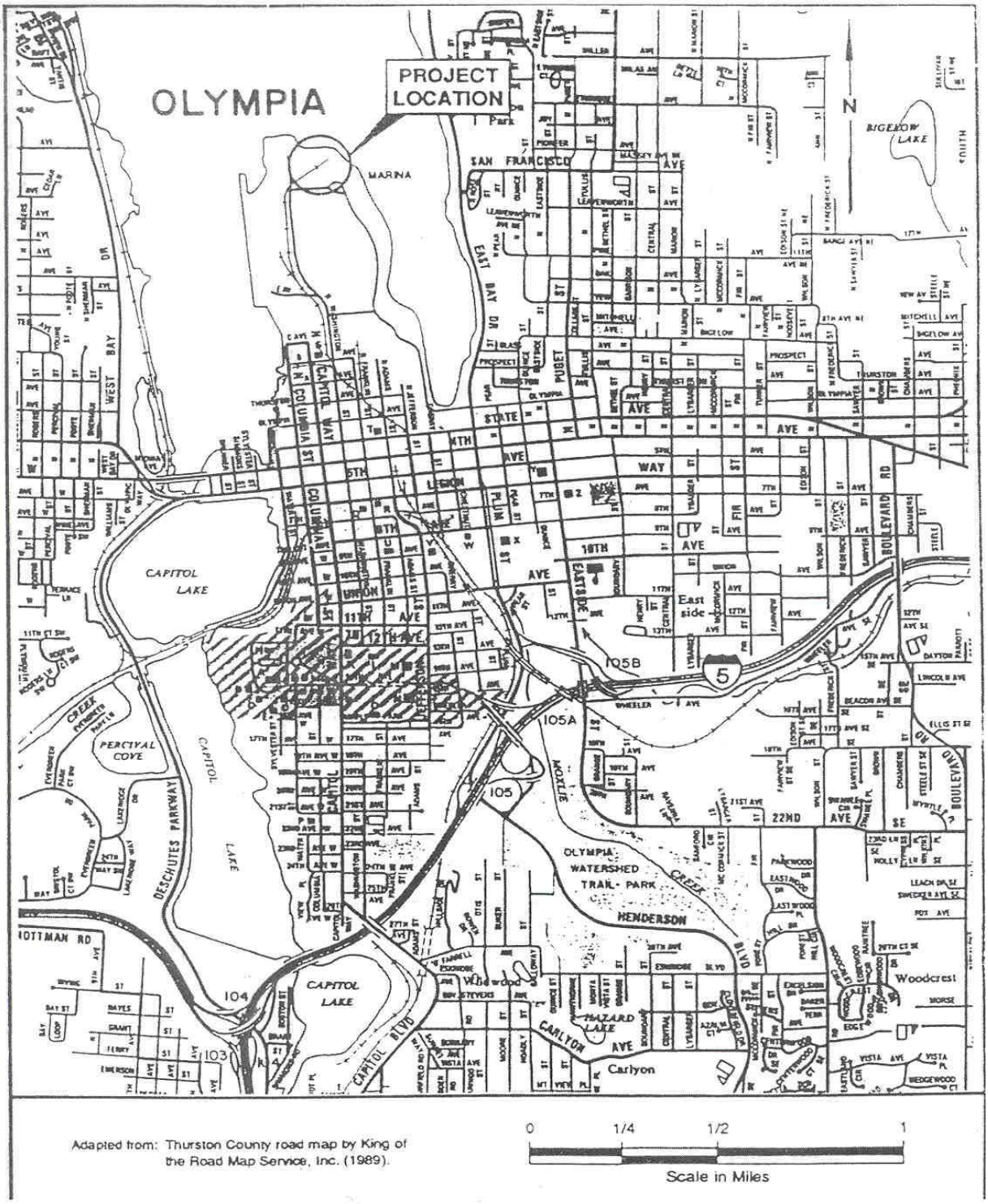


FIGURE 1. SITE LOCATION MAP

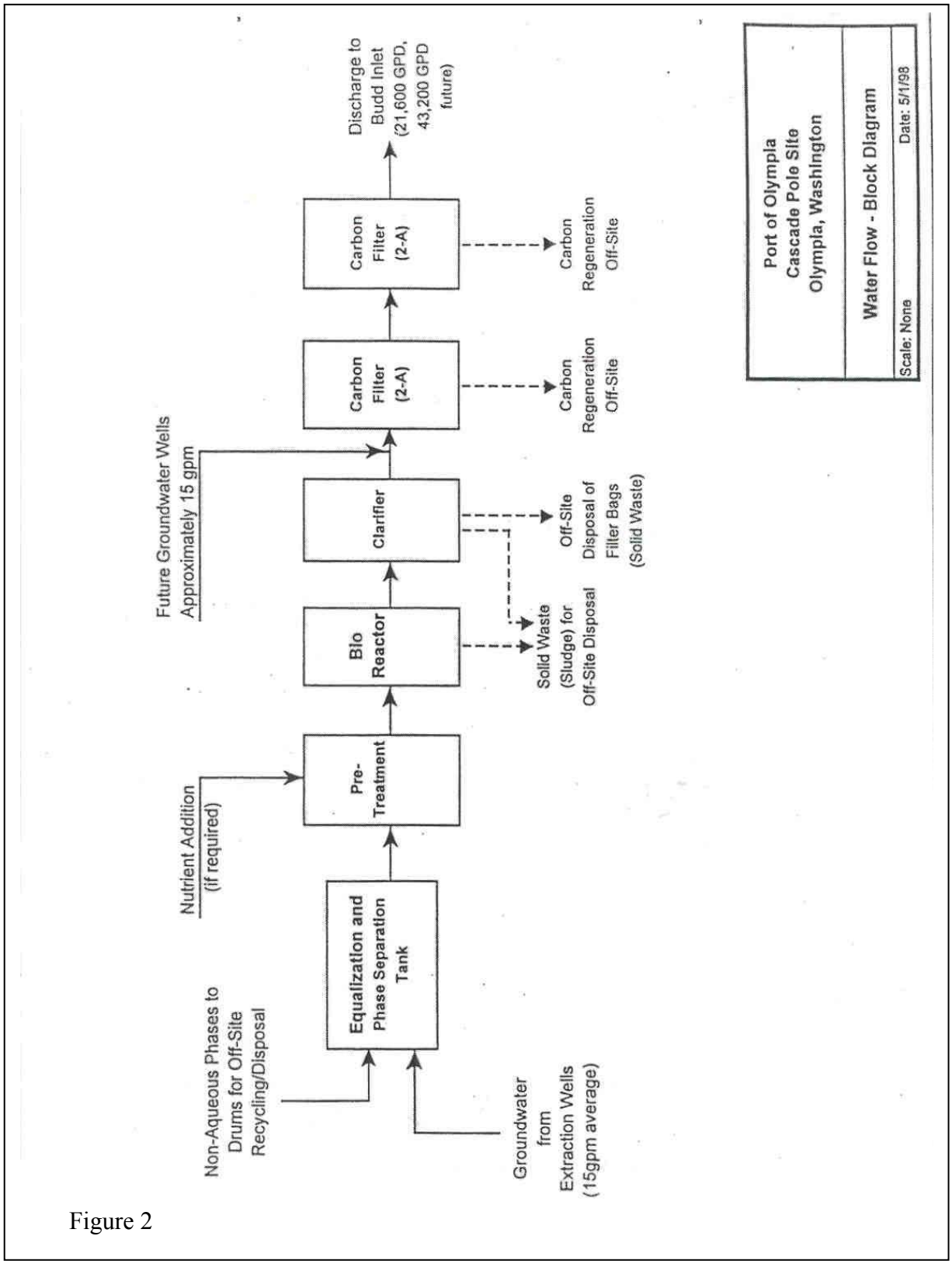

Non-Aqueous Phases to Drums for Off-Site Recycling/Disposal
Groundwater from Extraction Wells (15gpm average)
Nutrient Addition (if required)
Equalization and Phase Separation Tank
Pre-Treatment
Bio Reactor
Clarifier
Carbon Filter (2-A)
Carbon Filter (2-A)
Future Groundwater Wells Approximately 15 gpm
Solid Waste (Sludge) for Off-Site Disposal
Off-Site Disposal of Filter Bags (Solid Waste)
Carbon Regeneration Off-Site
Carbon Regeneration Off-Site
Discharge to Budd Inlet (21,600 GPD, 43,200 GPD future)
Port of Olympia
Cascade Pole Site
Olympia, Washington
Water Flow - Block Diagram
Scale: None
Date: 5/1/98

Figure 2

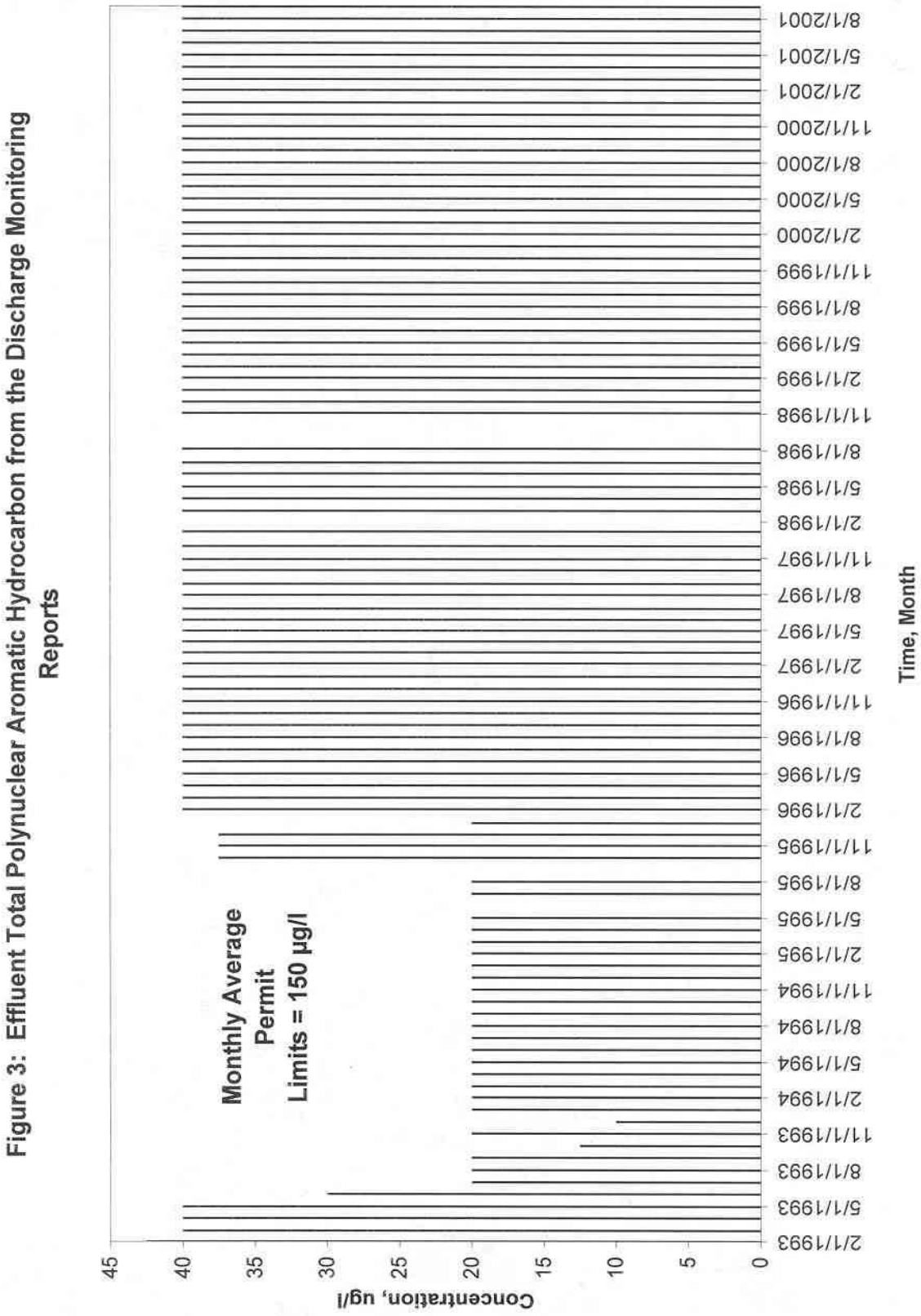


Figure 3: Effluent Total Polynuclear Aromatic Hydrocarbon from the Discharge Monitoring Reports

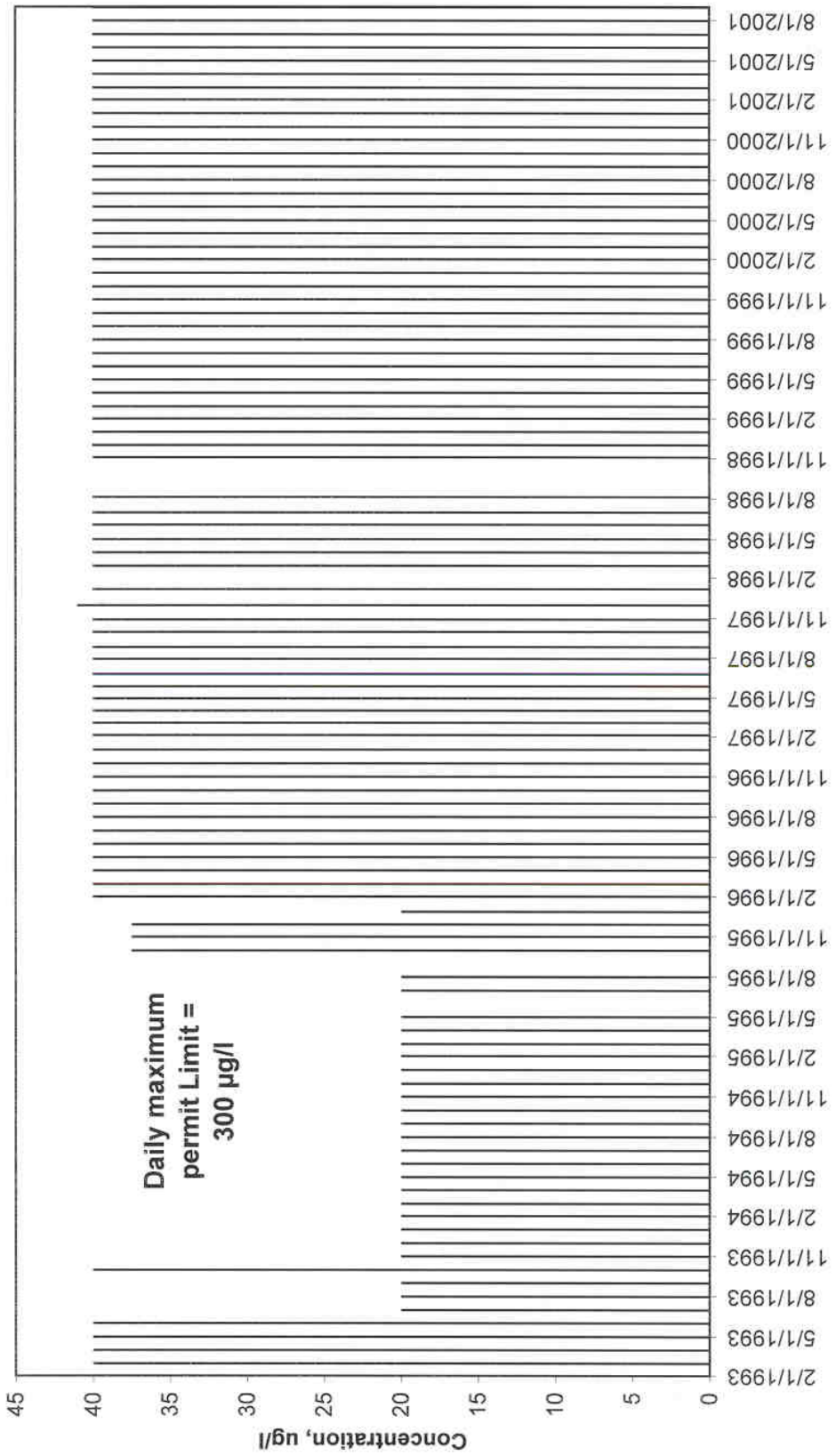


Figure 4: Effluent Total Polynuclear Aromatic Hydrocarbon from the Discharge Monitoring Reports

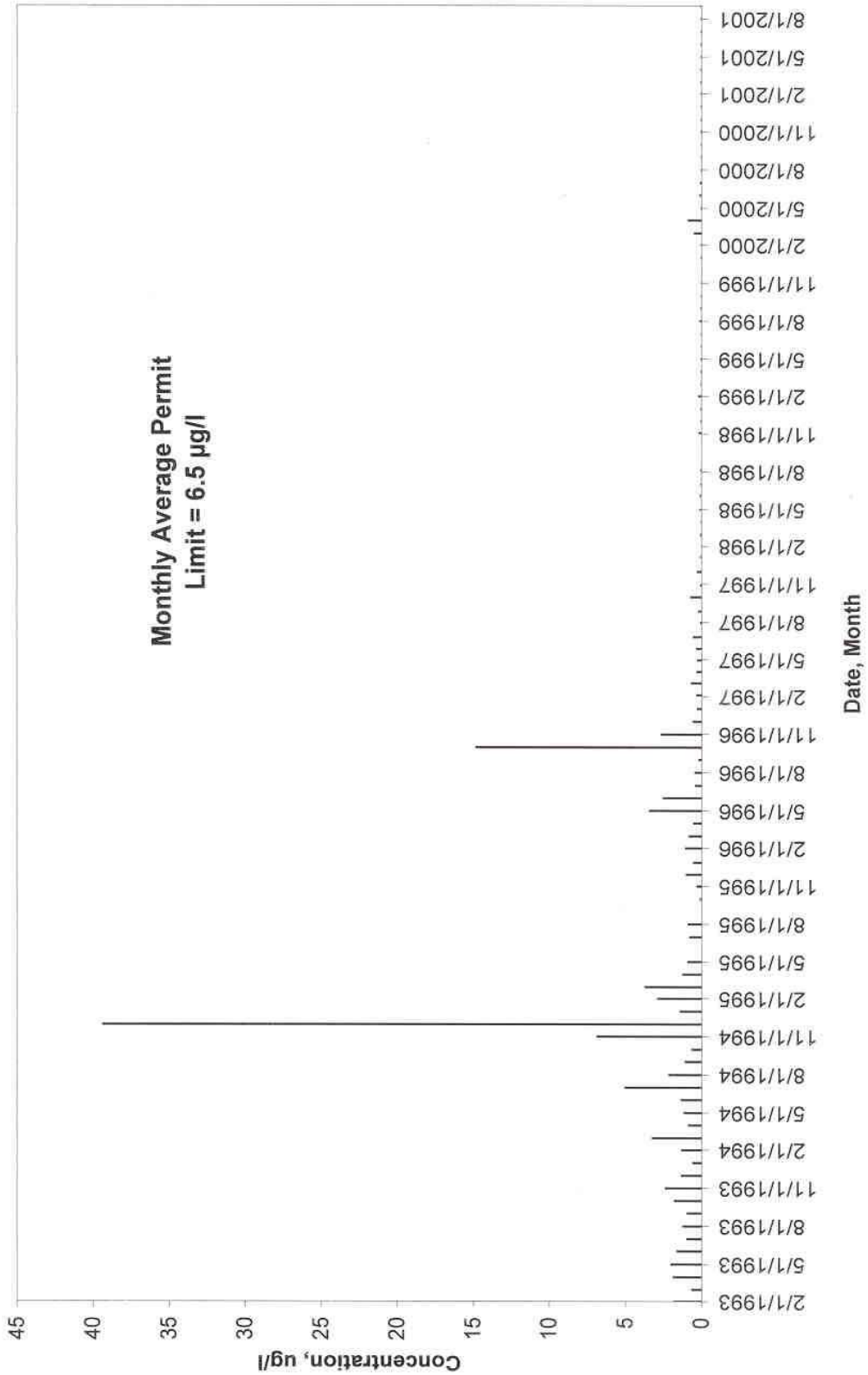


Figure 5: Effluent Pentachlorophenol Monthly Average Data from Discharge Monitoring Reports

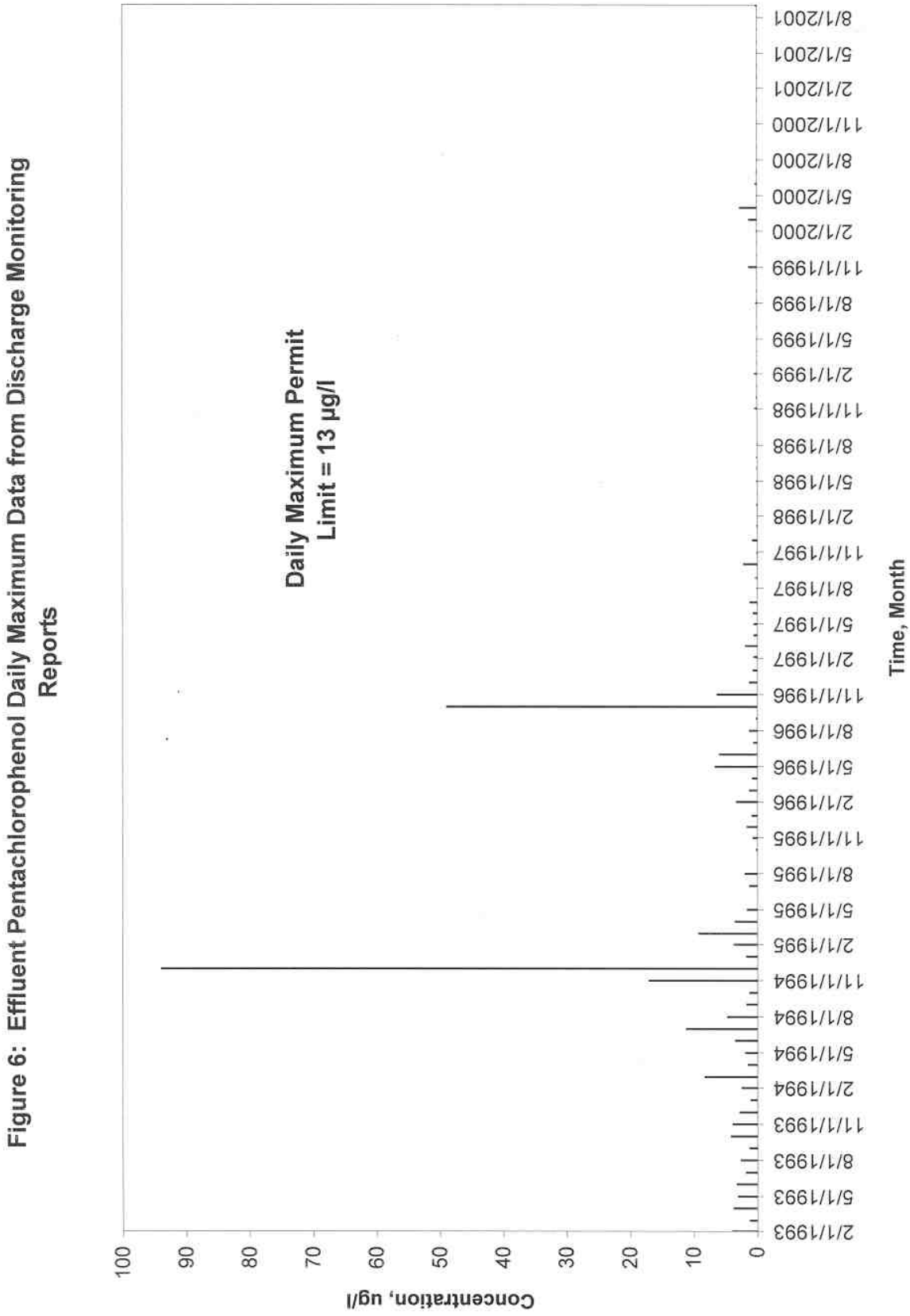


Figure 6: Effluent Pentachlorophenol Daily Maximum Data from Discharge Monitoring Reports

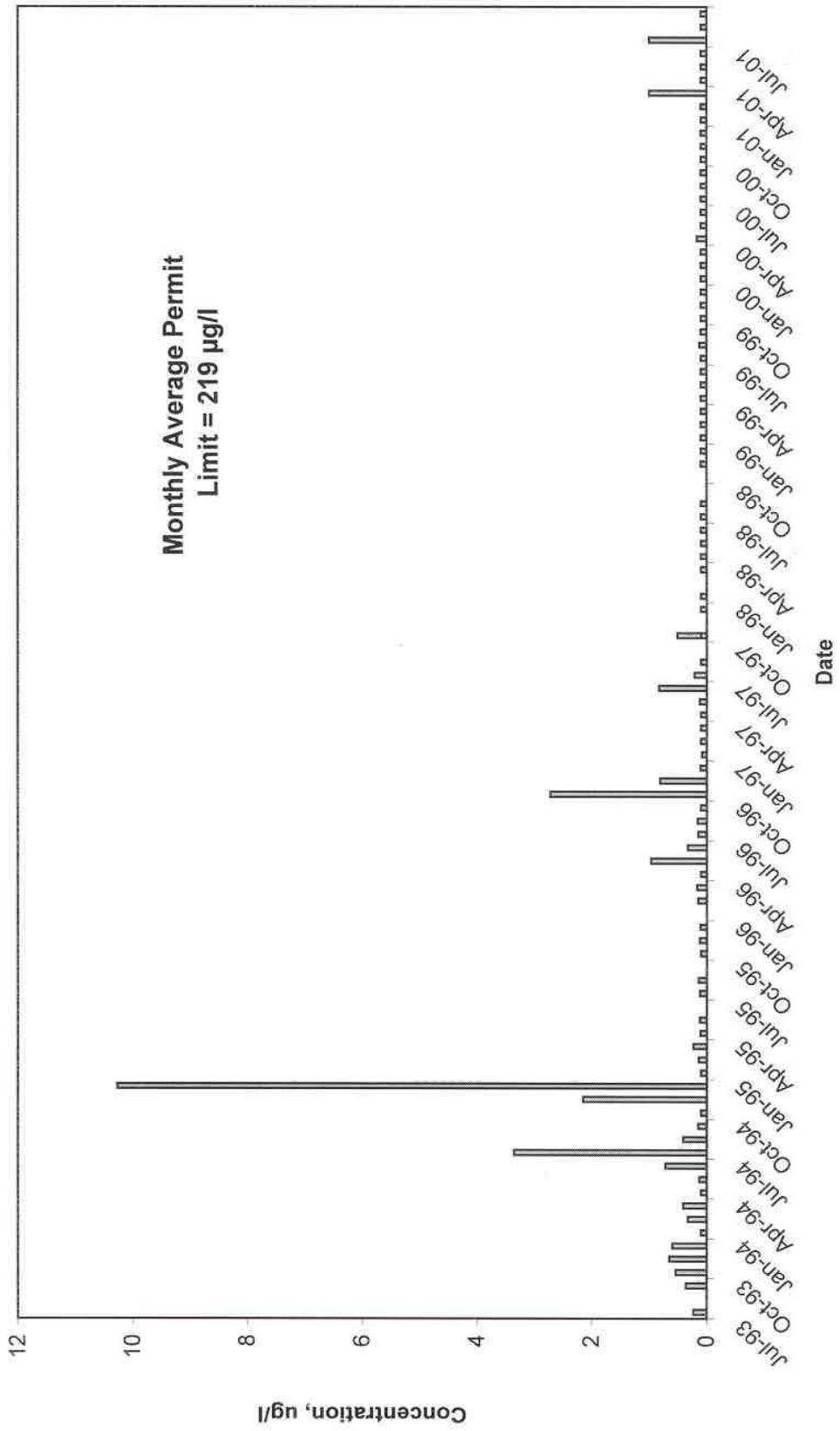


Figure 7: Effluent Tetrachlorophenol Monthly Average Data from Discharge Monitoring Reports

Figure 8: Effluent Tetrachlorophenol Daily Maximum Data from Discharge Monitoring Reports

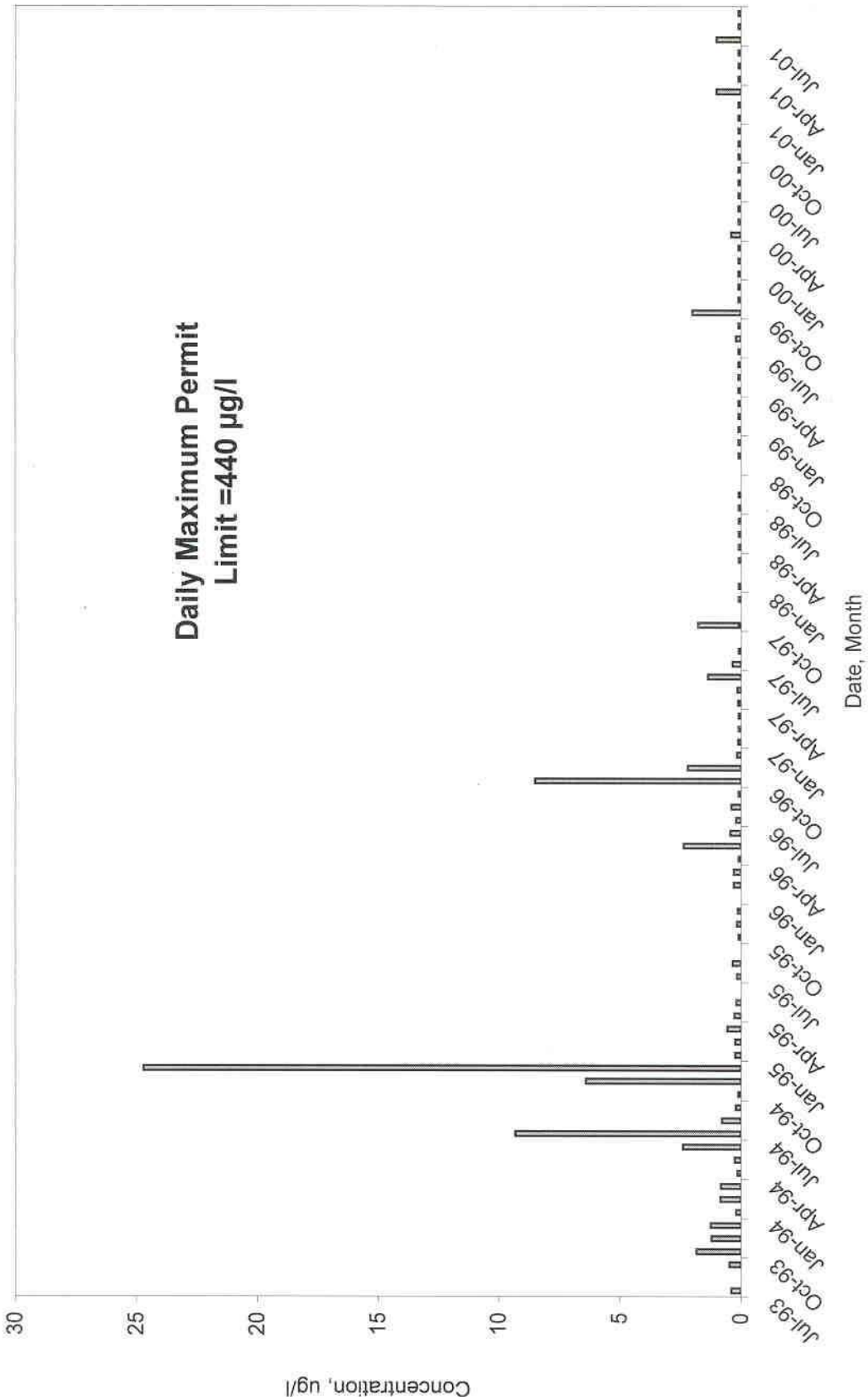
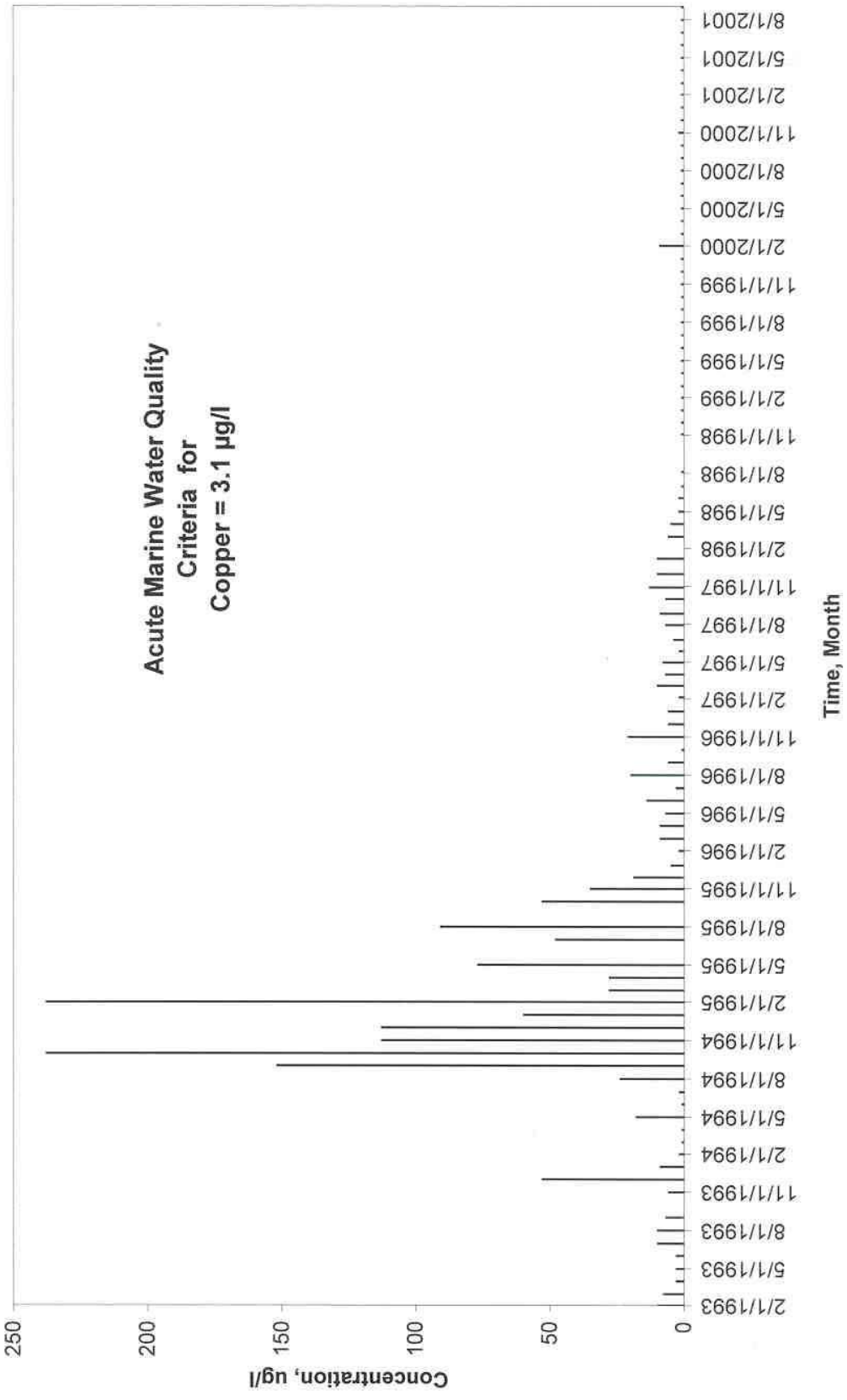


Figure 9: Effluent Total Recoverable Copper Concentrations from Discharge Monitoring Reports



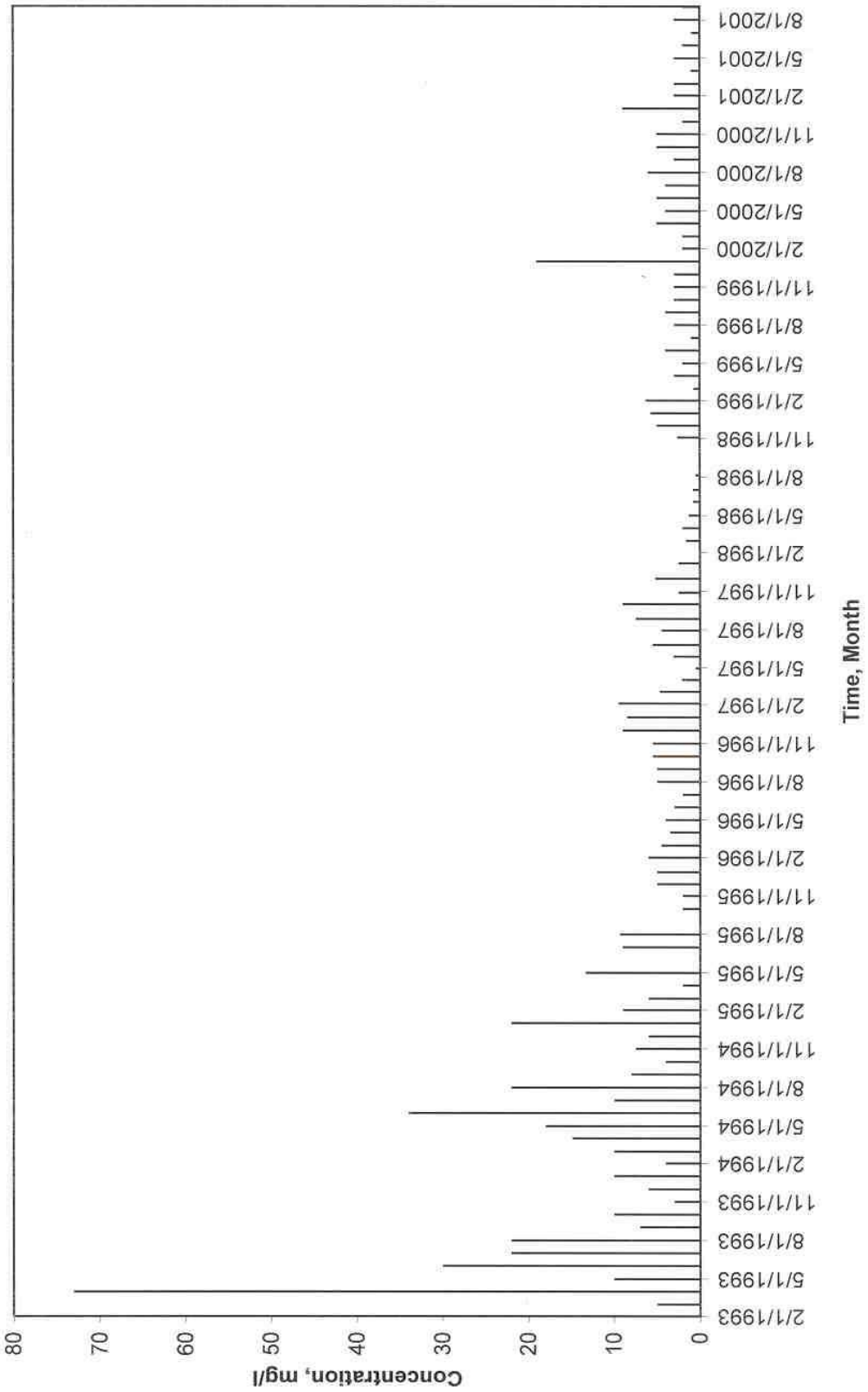


Figure 10: Effluent Total Suspended Solids Concentration from the Discharge Monitoring Reports

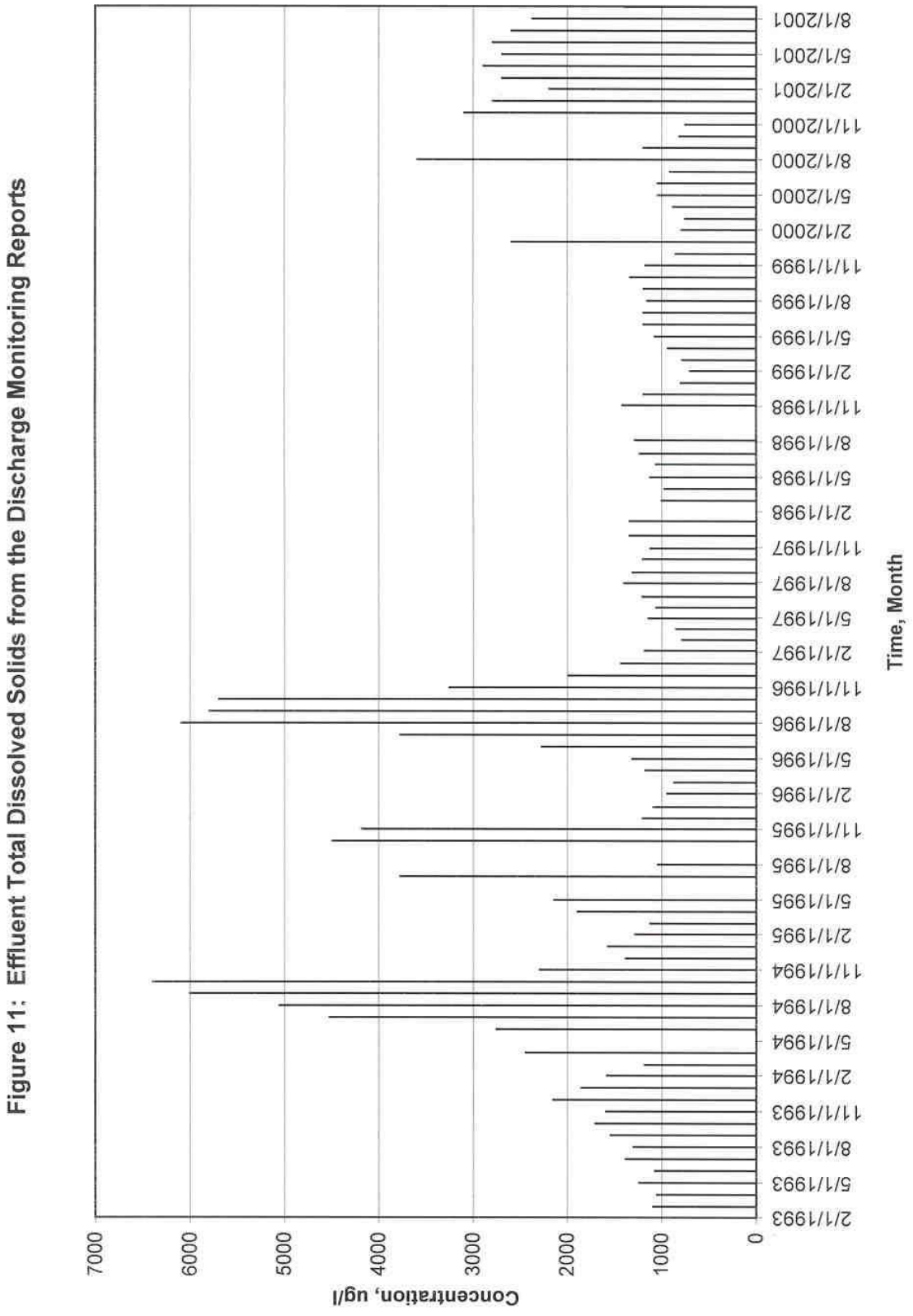


Figure 11: Effluent Total Dissolved Solids from the Discharge Monitoring Reports

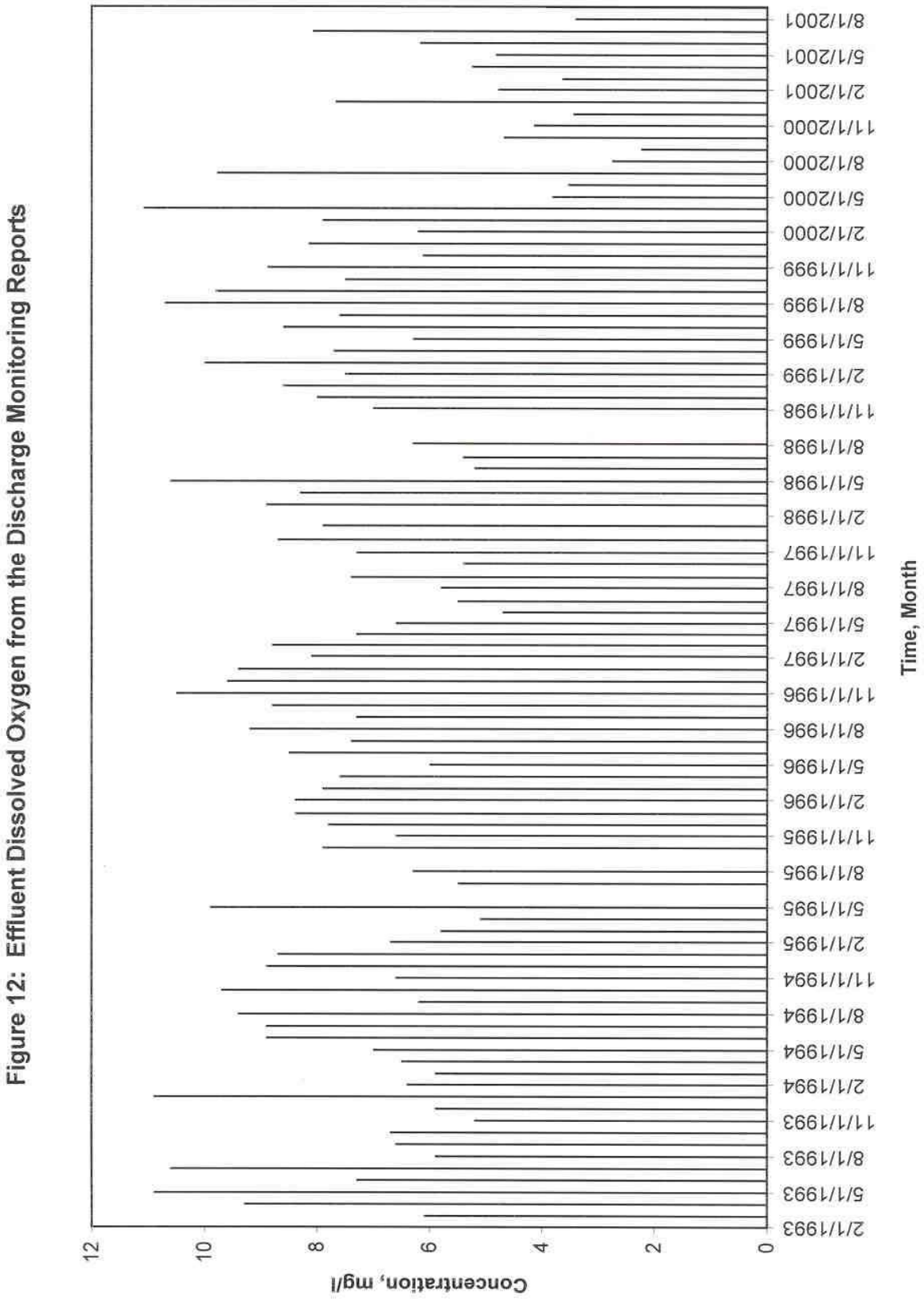


Figure 12: Effluent Dissolved Oxygen from the Discharge Monitoring Reports

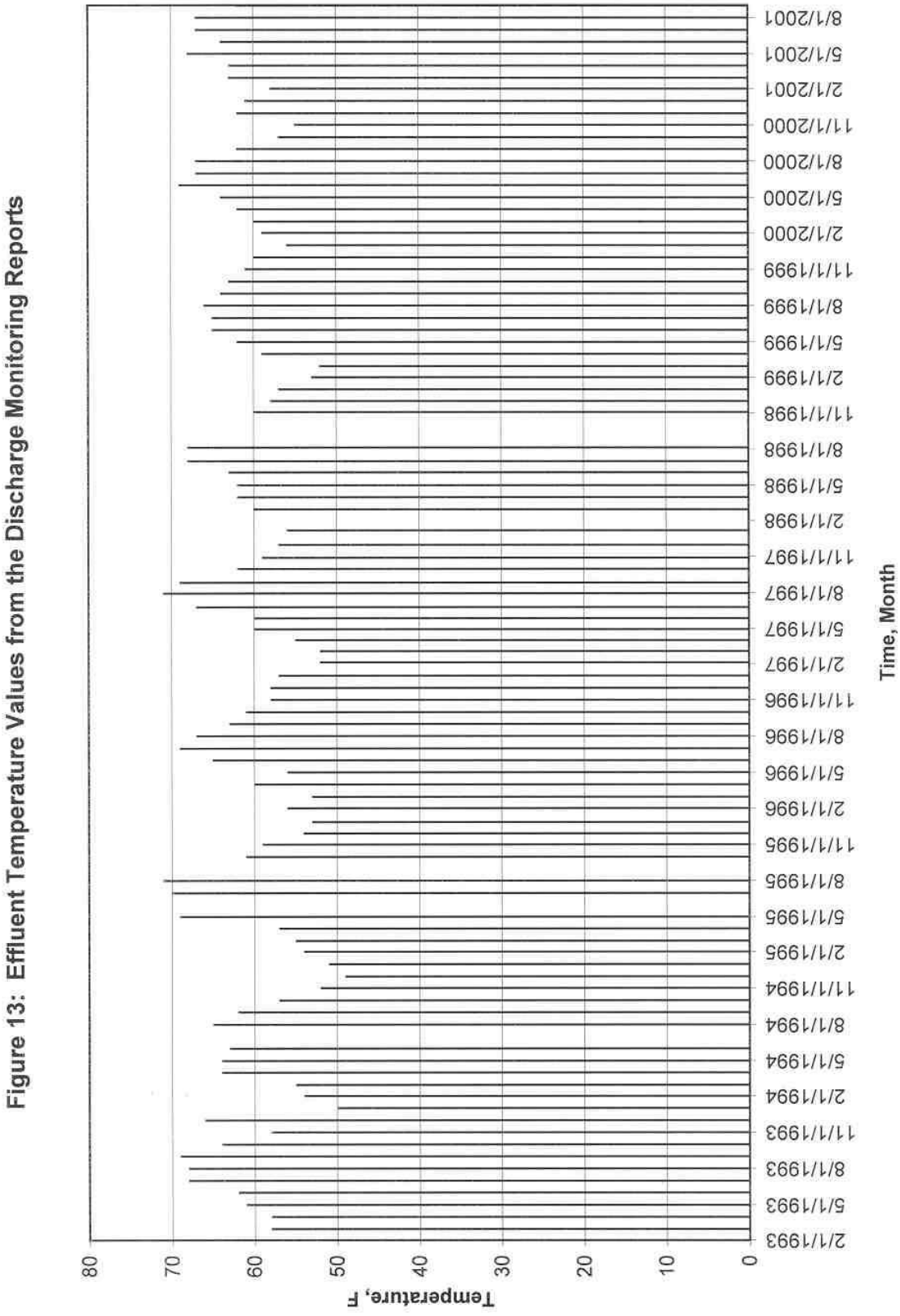


Figure 13: Effluent Temperature Values from the Discharge Monitoring Reports

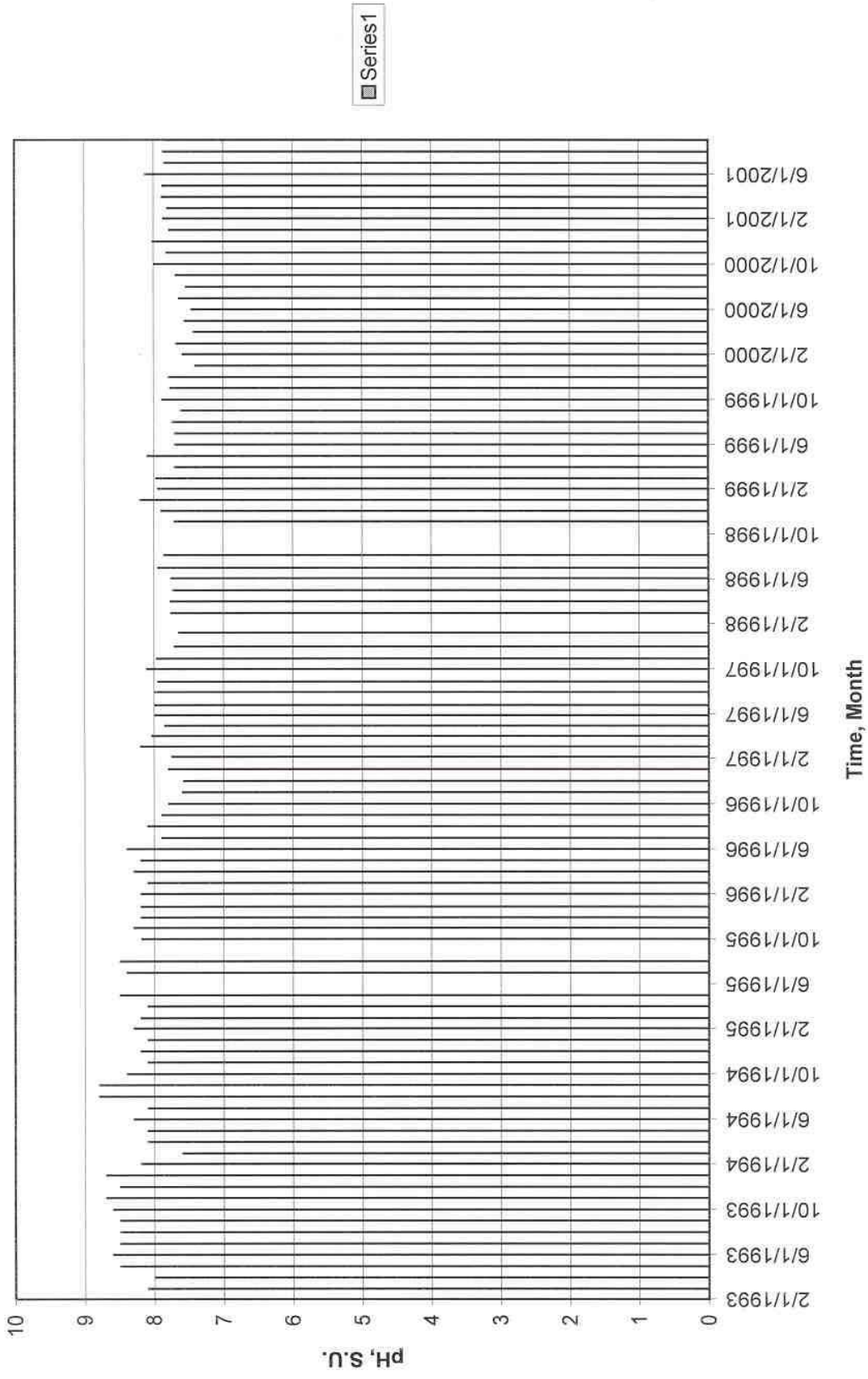


Figure 14: Effluent pH values from the Discharge Monitoring Reports

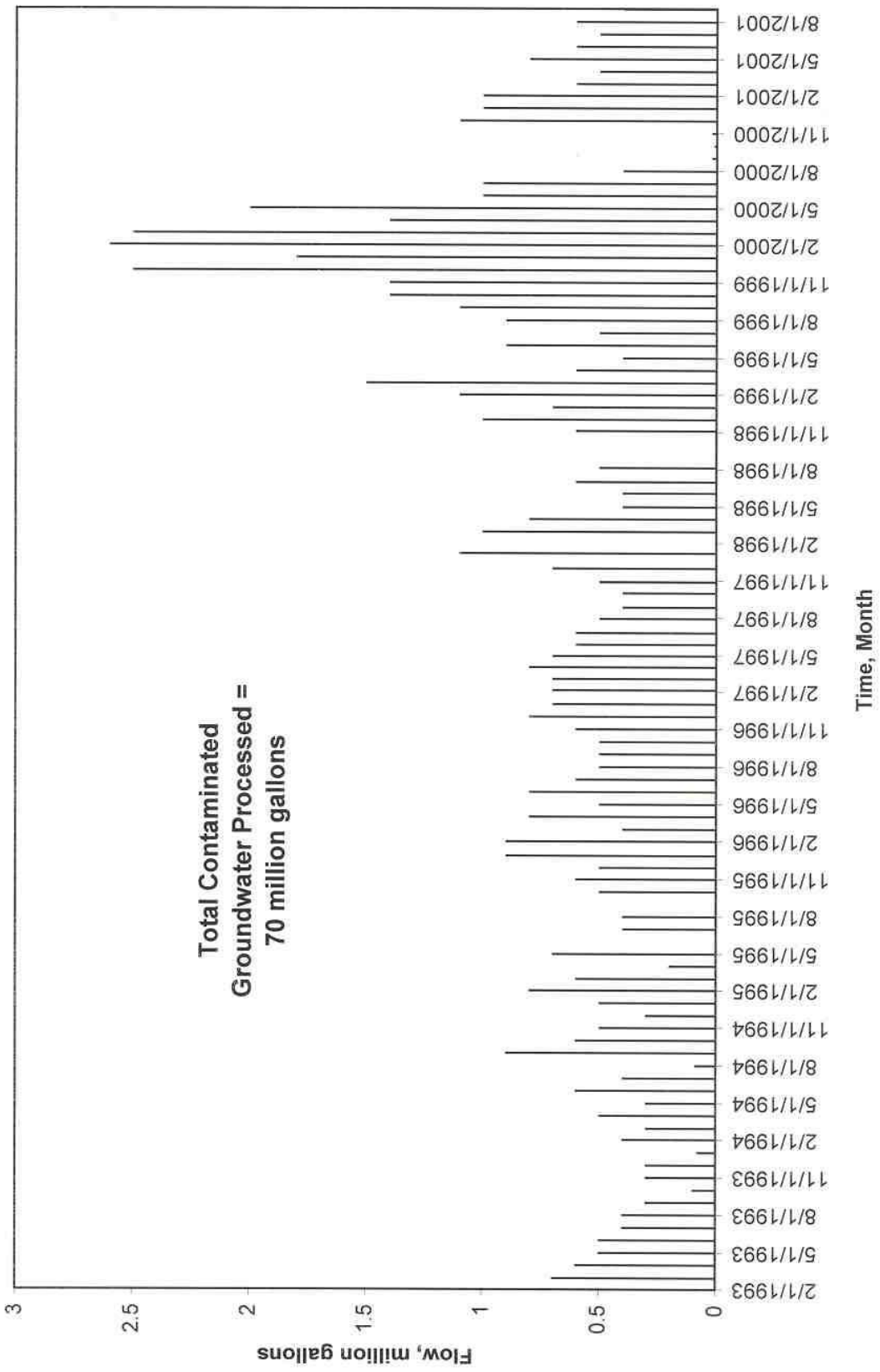


Figure 15: Treated Effluent Discharge from the Discharge Monitoring Reports